

## REMARKS

Claims 1-11, 14-32 and 35-57 are pending. Claims 45 and 46 have been allowed.

Claims 6, 23-30 and 47-49 have been found allowable if rewritten in independent claim format.

Claim 4 has been amended to recite “wherein an ectopic beat is tracked” in the body of the claim. Support for this amendment can be found in the specification at page 5, lines 12-19 and page 7, line 20 through page 8, line 4.

Claim 50 has been rejected. However, claims 50 depends from allowable claim 25.

Applicant requests that claim 50 be made allowable.

### **Rejections for obviousness under 35 U.S.C. § 103(a)**

Claims 1-5, 7-11, 14-22, 31, 32, 35-44, 50 and 54-57 have been rejected as obvious over U.S. Patent No. 5,215,098 to Steinhaus et al. (“Steinhaus”) in view of U.S. Patent No. 5,713,367 to Arnold et al. (“Arnold”).

The Examiner contends that Steinhaus discloses correlating a template with acquired data. The Examiner acknowledges that Steinhaus does not disclose or suggest tracking ectopic beats, including premature atrial contractions (“PAC”) (Office Action, page 2). According to the Examiner, one of ordinary skill in the art would have found “it obvious to use the teaching of Arnold et al. for comparing cycle-to-cycle variability in a sensed heart to track ectopic beats ... because they represent a temporal pattern of an ECG which is measurable in heart rate variability of the data correlated in the Steinhaus et al. device” (Office Action, page 2, last sentence).

Steinhaus is directed to a method and device for storing cardiac signals by compressing acquired signals and storing the signals as a template. A later-acquired cardiac signal can be compressed and compared with the template to derive a correlation coefficient (Steinhaus,

abstract).

Arnold is directed to a method for assessing cardiac electrical stability by measuring alternans. Alternans is a pattern in which certain portions of the electrocardiogram alternate in shape in successive beats in an ABABAB ... pattern (Arnold, column 2, lines 22-26). The method includes the steps of receiving a signal representative of heart activity in a patient whose heart has been stressed without applying pacing stimuli, and processing the signal to determine the level of alternans in the signal (Arnold, column 2, lines 44-54).

The rejection of claims 1-5, 7-9, 54 and 55:

Claims 1-5, 7-9, 54 and 55 are not obvious because the combination of Steinhaus and Arnold does not disclose or suggest tracking ectopic beats. The Examiner acknowledges that Steinhaus “lacks a suggestion to track ectopic beats” (Office Action, page 2, last paragraph). Thus, the disclosure or suggestion to do so must come from Arnold. Arnold, however, recommends excluding abnormal waveforms from the acquired signals. For example:

- “Grossly abnormal waveforms, such as premature atrial and ventricular beats, disrupt subtle temporal pattern of beat-to-beat variability in waveform morphology, such as alternans” (Arnold, column 15, lines 60-63); and
- “Once the abnormal beats are identified, it is generally advantageous to choose a data epoch with few or no abnormal beats” (Arnold, column 16, lines 30-32).

Thus, Arnold does not disclose or suggest tracking ectopic (i.e., abnormal) beats. Arnold is directed to a method of assessing alternans. This assessment, according to Arnold, is disrupted by an abnormal beat, and Arnold recommends replacing or removing an abnormal beat from the

sequence of acquired beats (see, e.g., Arnold, column 17, lines 10-15 and 50-54).

This obviousness rejection should be withdrawn because the references do not disclose or suggest tracing ectopic beats. The Examiner acknowledges that Steinhaus does not disclose or suggest this limitation. Arnold recommends *exclusion* of ectopic beats from the acquired beats. An ectopic beat cannot be tracked if it is not acquired and compared to a template.

**The rejection of claims 10, 11, 14-22, 31, 32, 35-44, 56 and 57:**

Claims 10, 11, 14-22, 56 and 57 are directed to methods for deriving a p-wave. Claims 31, 32 and 35-44 are directed to methods for deriving a non-synchronous subcomponent. The rejection of these claims should be withdrawn because the Examiner has not made out a *prima facie* case of obviousness. The Office Action does not include any assertion that the references disclose or suggest a method for deriving a p-wave or non-synchronous subcomponent. Further, the references do not include any such disclosure or suggestion.

**Objections to the claims**

Claims 6, 23-30 and 47-49 were indicated as being allowable if rewritten in independent claim format because they depend from rejected base claims. For the reasons stated above, however, Applicant believes that the base claims should be allowed. Thus, Applicant respectfully requests that this objection be withdrawn. Alternatively, if the rejection to the base claims is maintained, Applicant would be amenable to an Examiner's Amendment if that would expedite allowance of this case.

**Conclusion**

No new matter has been added by these amendments. In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

If there are any other issues remaining which the Examiner believes could be resolved through either a Supplemental Response or an Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Respectfully submitted,

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